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Are Canadians More Likely to Lose Their Jobs in the 1990s?

by Garnett Picot and Zhengxi Lin

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Abstract

Canadians are increasingly concerned about rising job instability. Job instability can take various forms and can be measured in numerous ways. As part of a comprehensive research effort to examine job instability, this paper uses the Longitudinal Worker File (LWF) on the separations of Canadian workers from 1978 to 1993 to assess one dimension of job instability --- permanent layoffs. The key question addressed in the paper is "have permanent layoffs in Canada increased in the 1980s and early 1990s as compared to the late 1970s?". We examine the time trend of permanent layoffs first by looking at the permanent layoff rate and then by logistic regressions to predict the probability of permanent layoffs. The analysis is undertaken for all workers as well as for particular sub-groups.

Created by many complex processes, permanent layoffs are an on-going feature of our economy and not as cyclically sensitive as quits and other means of workforce adjustments used by firms (i.e., temporary layoffs and hirings). Every year, over a million workers are permanently displaced from their jobs, no matter whether in recessions, recovery or expansionary periods. This is as true in the 1980s and early 1990s as in the late 1970s.

Permanent layoffs to 1993 have shown no overall sign of an upward trend when compared to earlier years which are comparable in the business cycle. This holds true whether using the raw data or after controlling for changes in the composition of the workforce by gender, age, province, industry and firm size. However, an increase in the probability of permanent layoffs is observed among some particular groups of workers, notably older or higher paid workers, those in the primary sector or in health, education and welfare services. We will have to wait for more recent data to evaluate trends beyond 1993.

The data further show that the Canadian labour market adjusts to structural changes more through depressed hirings than increased layoffs. While the risk of permanently losing one's job, to 1993 at least, is no higher than in earlier comparable periods, the chance of finding a new job is considerably lower, at least in the aggregate. Furthermore, most job creation in the 1990s has been self-employment, where earning may be more unstable than among paid jobs.

Key words: job instability, job separation, permanent layoff, hiring, structural change
JEL classification: J63 --- Turnover

1. Introduction

Reports of extensive layoffs in large organizations, both public and private, are a regular occurrence in the media. Canadians are increasingly concerned about rising job instability in the 1990s. And not all of this concern is related to a deterioration in economic conditions, something normally associated with a high degree of job loss. There is a general perception that firms, even profitable ones, are abolishing jobs in an attempt to reduce labour costs and increase competitiveness. There are a number of potential reasons for this belief. With high levels of technological change, increasing trade liberalization and intensifying global competition, significant structural change and "down-sizing" may be taking place. Firms and industries are forced, and at the same time able, to reorganize in an attempt to improve their competitiveness.

Public policies, rising payroll taxes in particular, are often also associated with pressure on employers to cut labour costs through reducing labour demand, either by substituting other factors for labour or by adopting labour-saving technology. In addition, burdened with large deficits/debts, both the federal and many provincial governments are reducing their workforce as part of their deficit-fighting/debt-reducing exercise. All of these could have contributed to the concern that permanent layoffs and job instability have increased.

Increasing job instability can take numerous forms. The risk of permanent layoffs may have increased. Job tenure may have decreased and workers may have to change jobs and careers more frequently during their working life than was previously the case. It may also be that increasingly people find themselves in intermittent or "non-standard" work such as being on contract, in temporary jobs, or self-employed. The workforce may be increasingly polarized into "core/contingent" segments. Little is known of these trends. In the end, the concern is that earnings instability may have increased, which would lead to a number of issues regarding the welfare of Canadians. A significant increase in earnings or employment instability would have profound implications for the pensions of Canadians and the public pension system, the employment insurance and welfare systems, the training needed by Canadians if more frequent job or career changes were the result, and possibly increased need for other forms of labour adjustment, to say nothing of the impact of such rising instability and uncertainty on domestic consumption and demand.

As part of a comprehensive research effort to examine job instability, the objective of this paper is to assess one dimension of job instability --- permanent layoffs. The key question addressed in the paper is "have permanent layoffs in Canada increased in the 1990s as compared to earlier comparable periods?". The data source used in this research is the Longitudinal Worker File (LWF) on the separations of Canadian workers from 1978 to 1993.

2. Job Instability in North America: What Do We Know?

The concern over job instability is not new. The prolonged recession of the early 1990s brought with it speculation regarding increased levels of job loss, particularly among white-collar workers. In Canada, there was a sense that restructuring had increased permanent job loss relative to what had been observed in earlier recessions. During the recovery, there has been a sense that hiring has not increased

as firms are reluctant to add significantly to their workforce and, further, that layoffs remain the norm of the day.

In an attempt to better understand this situation, Picot, Lemaître and Kuhn (1994) compare permanent and temporary layoff patterns during the two recent recessions, and conclude that while the share of layoffs that were permanent rose marginally in the 1989-92 recession as compared to the early 1980s recession, the results are not consistent with the view that there has been a dramatic economy-wide shift towards more permanent job loss, which is associated by some with restructuring. Other researchers have looked at job loss from another perspective, that of job tenure. If permanent job loss increases, job tenure should fall.

Using Labour Force Survey data, Heisz (1996a, 1996b) finds that average job tenure has not changed significantly in the 1990s. He further observes, however, that new jobs have become increasingly polarized into short-term and long-term ones in the past fifteen years in Canada. He concludes that workers with more than one year of seniority are in fact enjoying increased job security, but that it is becoming somewhat more difficult to join these ranks.

In a very similar work, Green and Riddell (1996) find a "hollowing out of the middle of the job tenure distribution" in Canada, with more very short jobs but a greater longevity for very stable ones. They suggest that for young and less educated workers there has been a rise in job instability over the past decade. They note that this would fit with the observation from the earnings inequality literature that education and experience earnings differentials have increased (e.g., Morissette, Myles and Picot (1994); Beach and Slotsve (1996)). They also observe increased job tenure for older females, which they attribute to the increased commitment of these women to the labour market.

Thus, the results for Canada appear to be mixed. There is little change overall in the share of layoffs that are permanent or in average job tenure, but there is increasing instability among particular groups of workers. Job tenure studies have also been conducted for the U.S. economy. Swinnerton and Wial (1995) conclude that there was a decline in job stability during the 1980s, while Diebold, Neumark and Polsky (1994) find that overall job retention rates were fairly stable during the 1980s. Farber (1995) finds results that very much resemble those for Canada. He concludes that the prevalence of long-term jobs has not declined over the 1973 to 1993 period, but that less educated men are less likely to hold long-term jobs, and this was offset by an increase in the rate at which women hold longer term jobs. In examining the debate over these results, he concludes that the 1980s was not a period of generally decreasing job stability in the U.S.

Studies of layoff trends based largely on a series of "Displaced Workers" surveys have also been conducted in the U.S. Studying the two recessions, 1981-82 and 1991-92, Gardner (1995) finds roughly comparable rates of job loss for the two periods, but a change in the industrial and occupational mix of this job loss. Farber (1996) extends this analysis to include the 1991-93 period, and concludes that compared to a series of three-year periods since 1981, the job loss rate was the highest in the latest period, even though the economy was in a modest recovery. It seems as though much of this increase in 1991-93 was due to an increase in job loss due to "position/shift abolished", rather than due to increases from a rise in plant closings, slack work or other reasons. This fits with the

"downsizing" notions referred to earlier. This increase in the displacement rate in the early 1990s in the U.S. was noted particularly among older, more educated workers.

Hence, the findings also appear to be mixed for the U.S. The job tenure studies suggest little change in the length of a job through 1991 at least, but the latest study on worker displacement indicates that there has been a rise in the 1991-93 period.

It is important, however, to note that all of these studies are for paid workers and exclude the self-employed. Self-employment and contract work has been increasing as a share of all employment in both Canada and the U.S., and it is likely that job instability is higher among these workers.

3. *Permanent Layoffs in Canada: An Overview*

3.1 Data and Definition

The data used for analysis in this paper are extracted from the Longitudinal Worker File (LWF) created by the Business and Labour Market Analysis (BLMA) Division of Statistics Canada. The LWF is a 10 percent random sample of all Canadian workers, constructed by integrating data from three sources: the Record of Employment (ROE) files of Human Resources Development Canada (on worker separations), the T4 files of Revenue Canada (on all workers), and the Longitudinal Employment Analysis Program (LEAP[1]) file of BLMA, Statistics Canada.

All employers in Canada are required by law to issue a ROE to every employee working in insurable employment who has an interruption in earnings. The ROE indicates, among other things, the reason for the work interruption or separation, and can thus be used to determine different types of job separations. In addition, all employers must register with Revenue Canada using payroll deduction (PD) accounts and issue to each employee a T4 slip that summarizes earnings received in the year. Revenue Canada T4 files thus provide information on all Canadian workers.

Therefore, all workers at risk of job separations and those who actually separate from their jobs are known from these two data sources in each year. Together with additional information from the LEAP file, these data sources are combined by the Business and Labour Market Analysis (BLMA) Division of Statistics Canada to create a longitudinal file on all Canadian workers, the Longitudinal Worker File (LWF).

In the LWF, job separations are classified into three categories (quit, layoff and other) according to the reason for separation indicated in the ROE. Layoffs are separations due to shortage of work, and a layoff is defined as temporary if the separated worker returns to the same employer in the same or following year, otherwise it is permanent. If a worker is observed with a firm in one year but not in the

---

1 LEAP is a longitudinal file on Canadian businesses at the company level, see G. Picot and R. Dupuy (1996) for more details.

previous, this is considered a hire. This includes hiring to replace workers who have left, as well as expansion hiring.[2]

Permanent separation rates (the quit rate, permanent layoff rate and other permanent separation rate) are calculated as the number of permanent separations divided by total employment at any point in time during the year (i.e., the total number of person-jobs). The hiring rate is the number of hires divided by total employment in the year. However, the temporary separation rate is calculated by using the number of persons with at least one temporary separation rather than the total number of temporary separations. For more details on the LWF and definitions, see Statistics Canada (1992).

The LWF, with its very large sample size (e.g., 1.8 million records in 1988[3]), allows the possibility of very detailed sub-sample level analysis of job separations (e.g., by detailed age-group or industry). Furthermore, its longitudinal nature allows the possibility of constructing long-term variables such as the average annual earnings per year of employment over the entire 1978-93 period, a variable used in this paper.

Comparisons for the late 1980s with the Labour Market Activity Survey (LMAS) suggest that the number of permanent separations and layoffs are quite comparable[4] in both the LWF and LMAS, in spite of the fact that one is based on administrative data and the other is a sample survey. The LWF is used here because it is longitudinal, and has a longer time series (1978-93).

3.2 Permanent layoffs remain high over all phases of the business cycle

The Canadian labour market from 1978 to 1993 was characterized by an ongoing and more or less stable high level of permanent layoffs, no matter whether during expansions or recessions. The number of permanent layoffs remained over one million throughout the whole period except 1979 and 1980. It was about one million in 1978, rose to about 1.20 million in 1982 at the peak of the recession, declined to a little under 1.14 million in 1989 at the business cycle peak, and rose again to slightly over 1.28 million in 1991 in the middle of the most recent recession (Table 1 and Figure 1).

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[2] Hiring is in fact calculated from the following identity: $H_t = (E_t - E_{t-1}) + S_{t-1}$, where H represents total hirings, E the number of people employed by the firm at any time during the year, and S the number of people permanently separating from the firm. Therefore, $(E_t - E_{t-1})$ represents expansion hiring and S_{t-1} replacement hiring.

[3] The file is created on a person-job basis and the records are linked longitudinally. The most current year of information available for analysis of job separations is 1993.

[4] After adjustments are made to make the two sources comparable. The major adjustment relates to the exclusion of persons working less than 15 hours per week from the ROE data, since they are not eligible for UI.

Table 1
Job Separations and Hirings in Canada, 1978-1994

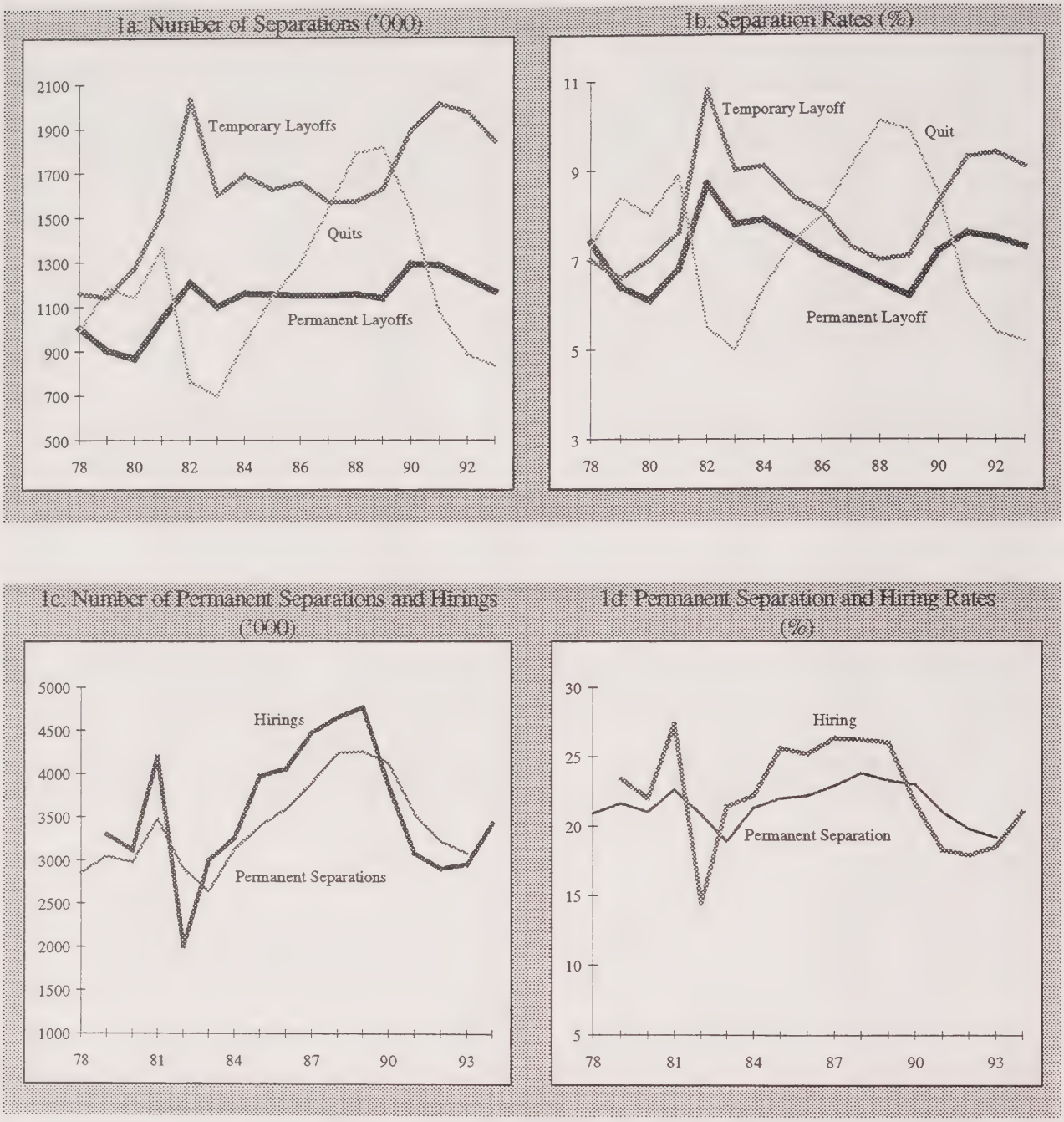
Number of Separations and Hirings ('000)

	Separations							Hirings
	Permanent				Temporary			
	Layoffs	Quits	Other	Total	Layoffs	Other	Total	
1978	1,003.7	991.6	858.7	2,854.0	1,159.3	994.1	2,153.4	n.a.
1979	902.7	1,183.5	952.0	3,038.2	1,139.2	1,035.6	2,174.8	3,293.7
1980	867.5	1,139.5	967.5	2,974.4	1,274.6	1,077.9	2,352.5	3,116.5
1981	1,042.9	1,361.4	1,072.2	3,476.4	1,518.7	1,141.1	2,659.8	4,192.1
1982	1,204.8	761.7	927.2	2,893.7	2,031.6	1,291.8	3,323.4	2,003.8
1983	1,098.7	696.8	844.7	2,640.2	1,600.5	998.3	2,598.8	2,992.9
1984	1,159.9	937.0	1,021.4	3,118.4	1,690.5	1,195.3	2,885.7	3,249.2
1985	1,152.8	1,145.4	1,097.3	3,395.5	1,626.6	1,236.2	2,862.8	3,966.0
1986	1,148.4	1,295.0	1,140.9	3,584.2	1,656.3	1,284.2	2,940.5	4,056.2
1987	1,149.4	1,539.6	1,204.5	3,893.6	1,569.6	1,291.0	2,860.6	4,466.5
1988	1,153.6	1,789.6	1,291.8	4,234.9	1,571.8	1,417.0	2,988.8	4,649.5
1989	1,137.4	1,813.0	1,302.2	4,252.6	1,624.0	1,449.4	3,073.5	4,761.4
1990	1,290.3	1,526.8	1,301.3	4,118.4	1,892.3	1,537.7	3,430.0	3,861.1
1991	1,283.8	1,070.5	1,182.9	3,537.2	2,006.3	1,472.8	3,479.1	3,078.6
1992	1,225.3	884.5	1,103.9	3,213.7	1,971.4	1,307.9	3,279.3	2,902.7
1993	1,165.2	837.3	1,071.5	3,074.0	1,840.6	1,245.0	3,085.5	2,952.0
1994	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3,424.1

Separation and Hiring Rates (%)

	Separation							Hiring
	Permanent				Temporary			
	Layoffs	Quits	Other	Total	Layoffs	Other	Total	
1978	7.4	7.3	6.3	20.9	7.0	6.5	12.9	n.a.
1979	6.4	8.4	6.8	21.6	6.6	6.7	12.7	23.4
1980	6.1	8.0	6.8	21.0	7.0	6.8	13.2	22.0
1981	6.8	8.9	7.0	22.6	7.6	6.7	13.6	27.3
1982	8.7	5.5	6.7	20.8	10.8	8.1	17.8	14.4
1983	7.8	5.0	6.0	18.9	9.0	6.4	14.8	21.4
1984	7.9	6.4	7.0	21.3	9.1	7.3	15.8	22.2
1985	7.5	7.4	7.1	22.0	8.4	7.2	15.0	25.6
1986	7.1	8.0	7.1	22.2	8.1	7.2	14.7	25.2
1987	6.8	9.1	7.1	22.9	7.3	6.9	13.7	26.3
1988	6.5	10.1	7.3	23.8	7.0	7.3	13.8	26.2
1989	6.2	9.9	7.1	23.3	7.1	7.2	13.7	26.0
1990	7.2	8.5	7.3	23.0	8.3	7.7	15.3	21.6
1991	7.6	6.3	7.0	21.0	9.3	7.8	16.3	18.3
1992	7.5	5.4	6.8	19.8	9.4	7.2	16.0	17.9
1993	7.3	5.2	6.7	19.2	9.1	7.0	15.5	18.5
1994	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	21.0

Figure 1
Permanent Layoffs, Temporary Layoffs, Quits and Hirings in Canada: 1978-1994



3.3 *The permanent layoff rate fluctuates with the business cycle, but it is not as cyclically sensitive as temporary layoffs, quits and hirings*

The permanent layoff rate does fluctuate with the business cycle. It has been around 6.1% to 6.2% at business cycle peaks (1989 and 1980), and in the 7.6% to 8.7% range during troughs (1991 and 1982). However, temporary layoffs increased more sharply while quits and hirings fell more substantially during recessions. Between 1989 and 1991, the number of temporary layoffs increased by 23%, quits declined by 40%, and hirings fell by 35%, but the number of permanent layoffs rose by only 13%. The 1980s recession told a similar story. Between 1979 and 1982, while the number of temporary layoffs rose by 78%, quits fell by 35%, and hirings declined by 39%, the number of permanent layoffs increased by under 34%. In spite of suggestions that a greater share of job loss was permanent in the 1990s due to cost-cutting and increased structural change, the data suggest the 1980s and 1990s recessions were similar in this regard. Picot, Lemaître and Kuhn (1994) note that while permanent layoffs did increase marginally as a share of all layoffs during the 1990-92 recession, the change was not significant and was not consistent with the view that there was a dramatic economy-wide shift towards more permanent job loss, often associated with restructuring. The pattern of worker displacement does not appear to have been significantly different in the 1990s recession as compared to the 1981-82 experience.

To empirically assess the cyclical sensitivity of permanent layoffs, temporary layoffs, quits and hirings, we use the unemployment rate as an indicator of the business cycle trend and regress the permanent layoff, temporary layoff, quit and hiring rates on the unemployment rate from 1978 to 1993.[5] The results confirm that temporary layoffs, quits and hirings are very cyclically sensitive but permanent layoffs are not as responsive to changes in the unemployment rate --- a one percentage point increase in the unemployment rate leads to a 0.89 percentage point decline in the quit rate, a 0.61 percentage point rise in the temporary layoff rate, a 1.38 percentage point decrease in the hiring rate, but only a 0.34 percentage point increase in the permanent layoff rate.[6] All these estimates are highly statistically significant and robust under different specifications.[7]

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[5] The hiring rate regression is from 1979 to 1994.

[6] Let TL = temporary layoff, Q = quit, PL = permanent layoff, H = hiring and U = unemployment, the following are the detailed regression results (t-ratios in parentheses):

$$\begin{aligned}
TLrate &= 2.4706 + 0.6084*Urate, \quad R^2 = 0.72; \\
&\quad (2.58) \quad (6.07) \\
Qrate &= 15.8585 - 0.8926*Urate, \quad R^2 = 0.78; \\
&\quad (13.11) \quad (-7.04) \\
Hrate &= 35.4825 - 1.3798*Urate, \quad R^2 = 0.38; \\
&\quad (7.76) \quad (-2.92) \\
PLrate &= 3.9604 + 0.3418*Urate, \quad R^2 = 0.67. \\
&\quad (6.49) \quad (5.35)
\end{aligned}$$

[7] A dummy variable on time trend is also tried as an additional regressor, but it is not statistically significant in any of these regressions. Furthermore, the coefficients on unemployment rate change very little under this specification.

3.4 *Why permanent layoffs are so persistently high and not as cyclically sensitive*

The answers lie in the different processes that result in these types of job separations. During economic downturns, quits sharply decline as workers face unfavourable demand conditions.[8] Also, employers may reduce their workforce by means other than permanent layoffs, such as increases in temporary layoffs, increases in separations for other reasons and cutbacks in hirings. During economic upswings, on the other hand, quits increase as workers find increased opportunities for improved job matching, and employers expand their workforce by recalling temporary layoffs and increasing hirings. These relatively simple processes may explain, to a large extent, the ups and downs of temporary layoffs, quits and hirings during recessions and expansions.

However, permanent layoffs are caused by more complex processes, including the worker-employer job-matching process, the continuous reallocation of market share and labour demand among firms within industries, structural declines in some industries, and decreases in aggregate demand. First, individuals seeking jobs and employers seeking workers create matches that may or may not be in the best interest of both parties. As workers learn more about the employer, and vice versa, the match is either continued or terminated. The worker terminates the match by quitting; the employer may turn to permanent layoffs. Permanent layoffs triggered by this job-match process occur on a continuous basis, both in recessions and expansionary periods. They may be more common during expansions as hiring increases, and would tend to involve workers who have been with the employer for a relatively short period of time.

Second, within any market or industry at any given point in time, some firms will be more successful than others --- some increase their market shares while others are losing. This reallocation of market share and labour demand among firms will lead to job gain and hirings in some firms but job loss and permanent layoffs in others. This process is also going on continuously, and permanent layoffs resulting from this process can occur even if overall labour demand and total employment in a market or industry is increasing.

Third, the Canadian economy has been experiencing a series of structural changes since the 1980s related to increasing trade globalization and international competition, changing composition of the labour force and accelerating technological advances. Consequently, some industries and sectors have been undergoing long-term decline in labour demand. As these structural changes carry on continuously, job loss and permanent layoffs occur in some industries and sectors even during recovery and expansions, primarily in the goods-producing sectors in the 1980s and 1990s. Fourth, permanent layoffs can also result from decreases in aggregate demand during recessions. They will tend to be economy-wide in scope and virtually non-existent in expansionary periods.

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[8] A series of legislated changes to the UI benefits for quitters (e.g., the penalty period increased from 1-6 weeks to 7-12 weeks and the benefit rate dropped to 50% in 1990; quitters became ineligible for UI benefits since 1993) may have also contributed to the decline of quits since the early 1990s.

For all these reasons, particularly the on-going competitions and continuous reallocation of labour demand among firms, permanent layoffs remained at high levels even during expansionary periods.[9] We now turn to the core question of the paper, "have permanent layoffs in Canada increased in the 1980s and early 1990s as compared to the late 1970s?".

4. Permanent Layoffs in Canada: The Time Trend

This section empirically investigates whether or not permanent layoffs in Canada have increased in the late 1980s and early 1990s as compared to the late 1970s and early 1980s. This is done first by looking at the permanent layoff rate, and then by employing logistic regression analysis to assess whether or not the probability of permanent layoffs has increased, after controlling for compositional changes in employment by gender, age, province, industry and firm size. As noted in Section 2, previous literature has found that the time trend of job tenure varies significantly among particular groups of workers. The analysis is, therefore, undertaken for the economy as a whole as well as for various regional labour markets, industrial sectors and particular groups of workers (i.e., by gender, age, firm size and earnings).

4.1 The permanent layoff rate

The annual permanent layoff rate from 1978 to 1993, for Canada and for various sub-groups, is reported in Table 2. Before examining the time trend, let's look at the differentials across different sub-groups. The risk of layoffs varies tremendously across different groups of workers. Characteristics of both workers and employers influence the relative risk of job loss. The following briefly summarizes the salient differences, many of which are well known.

Layoff rates are much higher among men than women. Between 1978 and 1993, the average annual layoff rate was 9.1% among men, almost twice as high as among women (4.8%). This gender differential may, to a large extent, be explained by the fact that the majority of the workforce in the high layoff industries (e.g., primary and construction) is male.[10]

The risk of layoff is higher among youth. Over the 1978-93 period, the average annual layoff rate was 8.3% among workers 15-24 years of age, falling to 7.6% among those 25-34, 6.4% among those 35-44, and around 6.2% among those over 45.

The risk of layoff varies substantially across provinces. Over the entire period, the average annual layoff rate ranges from 12.1% in Atlantic Canada, and 8.5% in Quebec and British Columbia, to 5.2% in Ontario.

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[9] See Picot, Lin and Pyper (1996) for a more detailed discussion on the significance of each of these processes and the reasons why permanent layoffs have remained so persistently high and are not as cyclically sensitive as hires, temporary layoffs and quits.

[10] From 1978 to 1993, men accounted for 87% of employment in the primary industries and 92% in the construction sector. As seen in Table 2, layoff rates are higher in these sectors than in others.

Table 2
Permanent Layoff Rates in Canada, by Various Characteristics, 1978-93 (%)

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
All Workers	7.4	6.5	6.2	6.8	8.7	7.8	7.9	7.5	7.1	6.8	6.5	6.2	7.2	7.6	7.5	7.3
By Gender:																
Male	9.0	8.0	7.8	8.6	10.9	9.9	9.9	9.4	9.1	8.6	8.3	8.1	9.4	10.0	9.8	9.4
Female	5.2	4.4	4.1	4.3	5.7	5.1	5.4	5.0	4.8	4.6	4.4	4.1	4.7	5.0	5.1	4.9
By Age Group:																
15-24	9.1	7.9	7.6	8.1	10.6	9.4	9.6	8.7	8.2	7.6	7.3	6.7	7.6	8.3	8.3	8.0
25-34	7.3	6.4	6.2	6.9	9.1	8.3	8.2	7.8	7.7	7.3	6.9	6.7	8.0	8.5	8.5	8.1
35-44	6.4	5.7	5.4	5.9	7.6	6.7	6.8	6.5	6.2	6.0	5.8	5.7	6.6	7.0	6.9	6.7
45-54	6.1	5.5	5.1	5.7	7.0	6.4	6.4	6.4	6.1	5.7	5.6	5.6	6.2	6.5	6.4	6.2
55-64	5.9	5.1	5.0	5.5	6.5	6.2	6.4	6.3	6.0	6.0	6.1	6.3	6.9	7.3	7.2	7.1
By Region:																
Atlantic[1]	11.6	10.8	9.9	11.1	11.9	12.0	13.1	12.9	12.6	12.3	11.9	12.0	12.4	12.9	13.4	13.2
Quebec	9.2	7.7	7.7	8.7	9.8	8.7	9.4	8.8	8.0	8.1	8.0	7.5	8.4	8.8	8.7	8.2
Ontario	5.7	5.1	4.9	5.2	6.6	5.8	5.6	5.2	4.7	4.4	4.0	4.1	5.4	5.8	5.6	5.3
Man. + Sask.	5.4	4.6	4.7	4.8	6.3	6.1	6.1	6.0	6.1	6.0	6.1	5.3	5.7	6.1	6.4	6.1
Alberta	5.4	4.9	4.6	5.7	10.3	9.8	9.1	7.9	8.9	7.6	7.0	6.4	6.7	7.4	7.5	7.5
BC	8.9	7.4	6.5	7.6	10.6	9.4	9.6	9.5	9.5	8.6	8.2	7.6	8.4	8.6	8.0	8.1
By Industrial Sector:																
Primary	13.1	11.4	11.0	13.0	15.7	17.0	17.5	17.3	18.9	17.0	17.3	15.9	16.4	17.3	17.4	17.7
Construction	26.3	24.9	24.3	26.0	32.3	31.3	31.6	28.9	27.4	25.7	25.6	25.2	28.9	30.2	30.2	29.1
Manufacturing	6.4	5.9	6.1	7.1	9.7	7.4	7.4	7.1	6.6	5.9	6.0	6.2	8.1	8.2	7.9	7.3
Distributive Services	5.0	4.5	4.4	4.9	7.0	5.9	5.7	5.7	5.5	6.6	4.7	4.5	5.7	6.2	6.2	6.1
Business Services	4.5	3.9	3.7	3.9	6.7	5.5	5.7	5.2	5.1	4.6	4.5	4.2	5.3	6.0	6.1	5.7
Consumer Services	7.3	6.0	5.5	5.6	7.5	7.1	7.4	6.6	6.3	5.4	5.2	4.5	5.2	6.2	6.3	6.1
Health, Education & Welfare	2.4	1.6	1.4	1.6	1.8	1.9	2.2	2.0	1.6	1.8	1.8	1.9	2.3	2.4	2.5	2.5
Public Admin.	5.2	3.7	3.0	3.3	3.5	3.6	4.2	4.0	3.6	3.7	3.3	3.1	3.1	3.4	3.5	4.0
By Firm Size:																
Under 20	12.8	11.1	10.7	11.2	13.9	13.1	13.4	12.6	12.1	11.2	10.9	10.3	11.7	12.2	12.4	12.2
20-99	9.6	8.5	8.4	8.8	11.5	9.9	9.7	8.9	8.8	7.8	7.8	7.8	9.2	9.7	9.6	8.9
100-499	6.5	6.2	6.0	7.0	9.0	7.7	7.3	6.7	6.3	5.9	6.1	5.9	7.1	7.6	6.7	6.4
500+	3.9	3.2	2.9	3.3	4.4	3.6	3.8	3.6	3.2	3.4	2.9	2.3	2.6	2.8	2.9	2.8
By Earnings[2]:																
Under $11,000	12.6	11.0	10.1	10.5	13.4	11.6	12.5	12.3	11.0	10.8	9.7	8.6	9.7	10.9	10.8	9.9
$11,000-$40,000	7.4	6.4	6.2	7.1	9.2	7.6	7.9	7.0	6.7	6.3	6.1	5.6	6.8	6.9	6.7	6.2
$40,000+	3.2	2.4	2.1	2.2	3.6	3.2	3.0	2.8	2.7	2.5	2.3	2.4	2.4	3.4	2.9	2.9

[1] Including Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick.

[2] Average annual earnings per year of employment over the entire 1978-93 period, expressed in 1993 constant dollars (adjusted by the consumer price index (CPI)).

Workers in the construction or primary sectors suffer the highest risk of permanently losing their jobs, whereas those in the public sector enjoy the lowest risk of layoff. On average, the construction sector permanently displaces over a quarter of its workforce every year, while in the public sector the average annual layoff rates range between 2.0% and 3.6%.

The risk of layoff significantly decreases with firm size. Workers in small firms are nearly four times as likely to be permanently laid off as their counterparts in large firms.

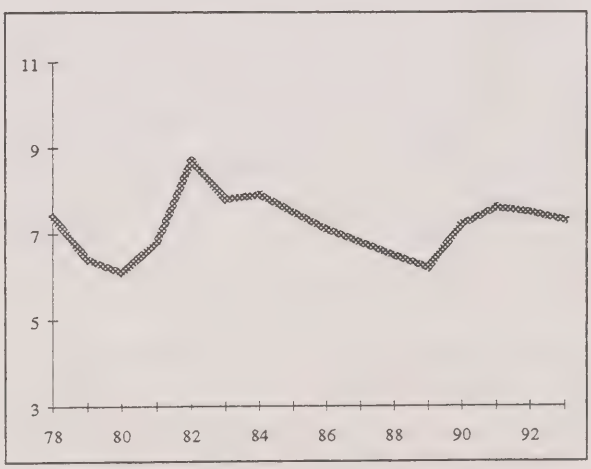
Higher paid workers, being generally better educated and occupying more skilled occupations, have a very low risk of layoff. Workers who averaged more than $40,000 per year of employment over the 1978-93 period experience an average annual layoff rate of only 2.7%, while those averaging under $11,000 a year of employment experienced a risk over four times higher (at 11.0%).

In short, the variation in the likelihood of layoffs among different groups of workers is seen to be very large. Workers with extremely stable jobs and low layoff rates are typified by the higher paid older workers in large public sector organizations. At the other extreme, a younger, lower paid worker in a small construction firm in Atlantic Canada would be facing a very high layoff rate. There is tremendous variation depending upon where one works and what one does. This large variation suggests that any change in the composition of workers can influence the aggregate layoff rate. For that reason compositional changes in employment are controlled for using multivariate regression analysis in the latter section.

4.1.1 The aggregate permanent layoff rate has not increased in the late 1980s and early 1990s

Apart from cyclical variations, the aggregate permanent layoff rate in Canada between 1978 and 1993 shows little evidence of upward trend (Figure 2). To further examine the time trend, we look to the annual average permanent layoff rate over comparable time-periods (i.e., roughly at the same phase of the business cycle). We split the late 1980s/early 1990s into three periods: the peak of the cycle period of 1987-89, which is compared to 1979-81;[11] the recession of 1990-91, compared with 1982-83; and the (very modest) recovery of 1992-93, compared with 1984-85. All these comparisons yield a permanent layoff rate that is either the same or lower in the 1990s (Table 3).

Figure 2
Permanent Layoff Rate in Canada, 1978-93 (%)



[11] There was a mini recession in 1980, which makes this comparison somewhat suspect.

Table 3
Annual Average Permanent Layoff Rate in Canada (%)

Around the 1980s Recession		Around the 1990s Recession	
1979-81	6.5	1987-89	6.5
1982-83	8.3	1990-91	7.4
1984-85	7.7	1992-93	7.4

There is another aspect to comparisons among recessions that is often ignored. These rates indicate the risk as of a point in time. However, the duration of a recession is also important. The 1990s recession was less severe than the 1980s downturn at any point in time, but it lasted much longer. For example, although employment fell less in the 1990s recession, it remained suppressed for a longer period of time, and hence the overall loss in employment (accounting for both change and duration) was greater (Picot, Lemaître and Kuhn (1994)). One could hence argue that although the layoff rate may have been lower in the 1990s, it remained at a high level over a longer period, resulting in more layoffs, and thus increasing the concern about the prospect of workers losing their jobs. In essence, such a perspective changes the reference period of the analysis from a fixed time-period (e.g., a year), to an event (i.e., the recession). Unfortunately, only annual data on layoffs are available here, so anything approaching precise comparisons for the two recessions is not possible.

If one assumes, however, that the 1980s recession is represented by 1982 and 1983 (the actual dates were third quarter of 1981 to the end of 1982, inclusive), and the 1990s recession by 1990 to 1992 (the actual dates were second quarter of 1990 to third quarter of 1992, inclusive), then the use of the annual data would result in a similar relative duration of the two recessions when the actual dates are used. The actual dates suggest the 1980s recession was 60% as long as the 90s downturn; the annual data suggests 66%.[12] Let us further assume that any layoffs above those observed during the business cycle peaks were "due to" the recessions. Furthermore, let us assume that the 6.5% layoff rate experienced during the three years prior to both of the recessions is the correct value for a business cycle peak. Then the portion of the layoff rate "due to" the recession is 2.2 percentage points in 1982 (i.e., 8.7%-6.5%), and 1.3 percentage points in 1983 (i.e., 7.8%-6.5%). During the 1990s, the corresponding values are 0.7 in 1990, 1.1 in 1991 and 1.0 in 1992. The 1980s recession resulted in an increase of 3.5 percentage points of layoffs, and the 1990s only 2.8 percentage points. If one applies these rates to some common population of workers, then even after accounting for differences in duration there were fewer layoffs in the 1990s "due to" the recession than there were in the 1980s.

Thus, whether one limits the comparisons to the layoff rate at any given point in time or attempts to address the notion that the longer 1990s recession may lead to more layoffs (even at the lower rate), the results are the same. The aggregate layoff rate was lower in the early 1990s than it was during comparable periods in the 1980s.

[12] There are various ways of defining a recession and establishing its timing. Here we use changes in employment, a measure reported in Cross (1996) that uses both changes in GDP and changes in employment to date recessions, as we are interested in an employment-related phenomenon, layoffs. The use of GDP only results in the same timing for the 1981-82 recession, but a somewhat longer 1990-92 recession.

4.1.2 The permanent layoff rate has risen among some groups of workers

Speculation regarding a rising layoff rate is related to a number of economic changes, including the impact of technology on employment, labour shedding in companies trying to reduce costs in the face of increased international competition, and other structural changes that may have taken place in and around the 1990s recession. These changes would have been expected to affect some workers more than others. For example, earnings inequality work (e.g., Bound and Johnson (1992), Katz and Murphy (1992)) suggests that technological change has had a disproportionate impact on lower paid, less skilled/educated workers, so disproportionately large increases in the risk of layoff may be expected among these workers. Downsizing is often thought to focus particularly on middle managers and other white-collar workers. When cutting back employment, in many unionized companies in particular, the "last in/first out" approach is often used, so one might expect to see a greater increase in layoffs among younger workers during the 1990s. Finally, the immunity that public sector workers have traditionally enjoyed with respect to layoffs may have been breaking down in the 1990s, as governments cut back to reduce deficits/debts. These are some of the areas that would be expected to register particularly large increases in layoffs if the underlying expectations are correct.

What do we find? First, we focus on rate changes among low and high income workers. The permanent layoff rate in the early 1990s was either the same as or lower than in earlier comparable periods for all three earnings groups. For workers with average annual earnings under $11,000 per year employed over the entire 1978-93 period, the rate decreased substantially (17-18%) during the recession and recovery periods of the 1990s as compared to corresponding periods in the 1980s. For those with average yearly earnings between $11,000 and $40,000, the rate also decreased (14% to 18%). For high paid workers, although there was no change when the recovery of the 1990s is compared to that of the 1980s, the rate was lower in the 1990s recession than in the 1980s recession.

Table 4
Annual Average Permanent Layoff Rate in Canada, by Average Annual Earnings (%)

Under $11,000				$11,000 - $40,000				Over $40,000			
Around the 1980s Recession		Around the 1990s Recession		Around the 1980s Recession		Around the 1990s Recession		Around the 1980s Recession		Around the 1990s Recession	
79-81	10.5	87-89	9.7	79-81	6.6	87-89	6.0	79-81	2.2	87-89	2.4
82-83	12.5	90-91	10.3	82-83	8.4	90-91	6.9	82-83	3.4	90-91	2.9
84-85	12.4	92-93	10.4	84-85	7.5	92-93	6.4	84-85	2.9	92-93	2.9

What of young workers? As Table 5 shows, the permanent layoff rate has in fact decreased rather substantially among workers 15-24 years of age in the late 1980s and early 1990s (by 8% in 1987-89, 20% in 1990-91 and 11% in 1992-1993) as compared to earlier comparable periods. Thus, in spite of weak labour market conditions for the young as reflected in declining real and relative youth wages and falling participation rates, the layoff rate has not risen. Only those 55 and over, experienced a significantly higher layoff rate (by 18% in 1987-89, 12% in 1990-91 and 13% in 1992-1993, compared to comparable earlier periods).

Table 5
Annual Average Layoff Rate and Period-to-Period % Change in Canada, by Age Group

	Annual Average (%)							Period-to-Period % Change		
	78-93	79-81	87-89	82-83	90-91	84-85	92-93	87-89/79-81	90-91/82-83	92-93/84-85
15-24	8.3	7.9	7.2	10.0	8.0	9.2	8.2	-8.5	-20.5	-10.9
25-34	7.6	6.5	7.0	8.7	8.3	8.0	8.3	7.2	-5.2	3.8
35-44	6.4	5.7	5.8	7.2	6.8	6.7	6.8	2.9	-4.9	2.3
45-54	6.1	5.4	5.6	6.7	6.4	6.4	6.3	3.7	-5.2	-1.6
55-64	6.2	5.2	6.1	6.4	7.1	6.4	7.2	17.9	11.8	12.6

The one sector that does demonstrate a noticeably higher layoff rate in the late 1980s and early 1990s is health, education and welfare services. As compared to earlier comparable periods, the layoff rate in this sector went up by 20% in 1987-89, 27% in 1990-91 and 19% in 1992-93, (Table 6). However, this sector still enjoys a relatively low rate of job loss, at around one-third of the overall industrial average (2.5% vs. 7.4% during 1992-1993). Other sectors that experienced a mild increase in the layoff rate during the 1990s recovery include business services, distributive services, manufacturing and primary. Other sub-groups that experienced a modest increase in the layoff rate during the 1990s recovery period are workers in the Atlantic provinces, Ontario, Manitoba and Saskatchewan.

Table 6
Annual Average Layoff Rate and Period-to-Period % Change in Canada, by Industrial Sector

	Annual Average (%)							Period-to-Period % Change		
	78-93	79-81	87-89	82-83	90-91	84-85	92-93	87-89/79-81	90-91/82-83	92-93/84-85
Primary	15.9	11.8	16.7	16.4	16.9	17.4	17.6	41.8	3.1	0.9
Construction	28.0	25.1	25.5	31.8	29.6	30.3	29.7	1.7	-7.1	-2.0
Manufacturing	7.1	6.4	6.0	8.6	8.2	7.3	7.6	-5.2	-4.7	4.8
Distributive Services	5.5	4.6	5.3	6.5	6.0	5.7	6.2	14.5	-7.8	7.9
Business Services	5.0	3.8	4.4	6.1	5.7	5.5	5.9	15.7	-7.4	8.3
Consumer Services	6.1	5.7	5.0	7.3	5.7	7.0	6.2	-11.7	-21.9	-11.4
Health, Education & Welfare	2.0	1.5	1.8	1.9	2.4	2.1	2.5	19.6	27.0	19.0
Public Admin.	3.6	3.3	3.4	3.6	3.3	4.1	3.8	1.0	-8.5	-8.5

In summary, the particular groups of workers who experienced substantially higher permanent layoff rates in the early 1990s are older workers (55 and over) and those in the health, education and welfare services sector. Other groups of workers that have experienced modest increase in layoff rates in the 1990s recovery period are those between 25-44 years of age; those in the Atlantic provinces, Ontario, Manitoba and Saskatchewan; those in the business services, distributive services, manufacturing and primary sectors.

There are two other avenues of comparison one could explore. First, it may be that a major change took place during and following the 1981-82 recession. Many significant changes in the labour market now observed appear to have taken place during that period, including declining

wages of the youth, rising earnings inequality, and increasing duration of unemployment among older workers. If the major change did take place in and around the 1981-82 recession, then only comparisons between years prior to and after that period would demonstrate any change. Unfortunately, we do not have a sufficiently long series to make such comparisons. The one that is possible in our data is the comparison of the two business cycle peaks: 1979-81 vs. 1987-89. Although the aggregate layoff rate remained unchanged, this comparison does reveal that the layoff rate has indeed increased substantially among some sub-groups of workers, most noticeably, among those 55 and over (by 18%); those in Atlantic Canada (by 14%) and Western Canada (by 14% to 38%); those in the primary sector (by 42%), distributive and business services (by around 15%), and health, education and welfare services (by 19%).

The second possibility is that the major effects on labour demand of downsizing and technological changes are reflected more in the hiring statistics than in permanent layoffs. As noted in Section 3, firms turn more to cutbacks in hiring than to increasing permanent layoffs during recessions. This may also be the case during periods of significant structural change.

4.2 Aggregate hirings

The aggregate annual hirings and hiring rates are reported in Table 1 and Figure 3. As before, we compare three periods: 1979-81 vs 1987-89 (peak), 1982-83 vs 1990-92 (recession), and 1984-85 vs 1993-94 (recovery). Both the average annual number of hires and average annual hiring rate were higher during the late 1980s/early 1990s business cycle peak and recession than during previous comparable periods (Table 7). This is expected, since i) the economy was simply larger; ii) the late 1980s was a very definite "boom" for the Canadian economy, particularly in central Canada; and iii) the 1990s recession was not as precipitous as its 1980s counterpart, although much longer.

Figure 3
Hiring Rate in Canada, 1979-94 (%)

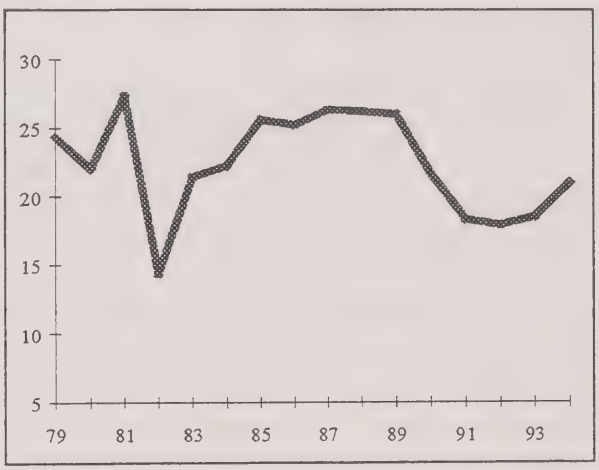


Table 7
Average Annual Aggregate Hirings and Hiring Rate in Canada

	Number of Hirings ('000)				Hiring Rate (%)			
	Late 70s/Early 80s		Late 80s/Early 90s		Late 70s/Early 80s		Late 80s/Early 90s	
Peak	79-81	3,534.1	87-89	4,625.8	79-81	24.2	87-89	26.2
Recession	82-83	2,498.4	90-92	3,280.8	82-83	17.9	90-92	19.3
Recovery	84-85	3,607.6	93-94	3,188.1	84-85	23.9	93-94	19.8

However, there was very little recovery in hirings during 1993 and 1994, as compared to the substantial recovery following the 1980s recession. Although the economy had expanded in size, there were actually fewer hirings during the 1990s recovery than that of the 1980s (3.6 million per year in the 1980s compared to 3.2 million in the 1990s). As a result, the hiring rate was much lower, at an annual average of 23.9% in the 1980s recovery years but only 19.8% in the 1990s. It would seem that the "jobless" recovery of the early 1990s was reflected by lower hiring rates rather than higher permanent layoff rates. Indeed, the risk of permanently losing one's job is no higher in the early 1990s than in earlier comparable periods but the chance of finding a new job is considerably lower, at least in the aggregate. This depressed hiring in the early 1990s likely influenced young people more than older workers, since they were the ones seeking new jobs. It may have contributed to the lower relative earnings among youth, and in part be responsible for their declining participation rate observed in the 1990s.

4.3 The probability of permanent layoffs

The discussion has so far been limited to univariate analysis. The above observations regarding the time trend of permanent layoff rates have not taken into account possible compositional changes in employment by worker/employer characteristics such as gender, age, province, industry and employer size, some of which have indeed changed very significantly over the 16-year period under study. To control for the effects of these compositional changes, we now turn to logistic regression analysis.

To investigate the trend of permanent layoffs over time, we pool the data from 1978 to 1993 and estimate the probability of a worker being permanently laid off in each year through the use of a series of year dummy variables. Other explanatory variables in the regressions include dummy variables on gender (2), age groups (5), province (10), industry (8), and employer size (4).[13] The model is first estimated on the sample of all workers using the pooled 1978-93 data. This allows the intercept to vary (i.e., the level of the probability can vary among sub-groups) but it imposes the same coefficients on the year dummy variables across all sub-groups (i.e., identical time trend on all sub-groups). Since our objective is to assess whether or not permanent layoffs have increased among particular groups of workers, the model is then re-estimated on various sub-samples to allow both the intercept and the coefficients of the year dummy variables to change.[14] This allows for different time trends across different groups of workers, but still controls for changes in the composition of workers by gender, age, province, industry and firm size.

We perform a total of 29 regressions, one for all workers and one for each of the following sub-population groups: men and women separately, 5 age groups, 6 regional labour markets, 8 industrial sectors, 4 firm-size classes, and 3 earnings levels. The objective here is to estimate the probability of layoff having controlled for compositional differences (by gender, age, province, industry and firm size) both through time and across different age groups. In other words, we ask

[13] 1978, male, age 15 to 24, Ontario, manufacturing and small employers serve as the control categories.

[14] All the explanatory variables in the full-sample model are used in these regressions except, of course, those used to identify each sub-population sample (e.g., a gender dummy is not in the male and female separate regressions).

whether, if the mix of workers were the same through time and across groups, would the permanent layoff rate have risen through time, and would inter-groups differences remain? We achieve this by selecting a particular group of workers (in this case, all workers in 1978) and using this same group to estimate the layoff probabilities for all years and across all sub-populations.[15] The composition of the population of workers then remains the same, since the same population is used in all years and across all groups. What changes through time are the coefficients on the year dummies, to allow a time trend. And what changes across groups are the coefficients on the worker and firm characteristics.

Thus, the estimated probabilities are those that would have been observed had the mix of workers in any given year resembled that 1978, but the likelihood of being laid off is allowed to vary through time. Similarly, this approach assumes that the mix of, for example, male and female workers with respect to industry, age, etc., is identical, and equal to that of all workers in 1978. However, the likelihood of a young woman being laid off is allowed to be different from that of a young man, and this results in different probabilities.

The selection of 1978 is arbitrary, and this work was repeated using 1993 as the reference year and the findings remain the same, although the levels of the probabilities are different. The detailed model specification, sample selection, and regression results are presented in the appendix. Tables 8 and 9 below report the predicted annual probabilities of permanent layoffs in Canada calculated as described above.

[15] Normally, to control for the composition (by age, gender, etc.) of a population we would simply estimate the probability of layoff for a particular group (say females) setting all other variables in the regression to their mean value. This works in OLS, but in logistic regression it leads to estimates of the probabilities that do not correspond with the estimates derived from the raw data itself. That is because of the non-linear nature of the logistic function. Rather than reporting estimated probabilities from the regression equation that are substantially at odds with those observed in the raw data, we choose an alternative means of controlling for compositional change. First, to get estimates from the regression model that correspond with those from the raw data it is necessary to estimate the probability for each individual in the sample (using the regression parameter estimates); and then, take the average probability across all individuals in the sample. If this is done for samples of different years (say 1978 and 1993), this does not control for compositional change, since the distribution for the population by age and gender, for instance, does change. Hence, when using this approach we hold the population composition fixed at that of some arbitrary year, and compute the probabilities for each individual in the sample for each year and sub-group, using the regression coefficient for that year and sub-group.

Table 8
Estimated Probabilities of Permanent Layoffs in Canada, 1978-93
(Based on each group's own parameter estimates and the sample of all workers in 1978)

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
All Workers	7.5	6.7	6.6	7.6	10.1	8.5	9.1	8.6	8.1	7.8	7.4	6.7	8.0	8.9	8.9	8.3
By Gender:																
Male	7.8	7.0	7.1	8.1	10.9	9.3	9.8	9.1	8.8	8.2	7.8	7.3	8.7	9.5	9.4	8.8
Female	6.3	5.6	5.2	6.0	8.0	6.6	7.3	7.0	6.3	6.5	6.0	5.1	6.2	7.2	7.3	6.8
By Age Group:																
15-24	9.2	7.9	7.6	9.0	12.1	9.9	11.1	10.1	9.4	8.7	8.2	7.1	8.8	9.9	9.7	9.6
25-34	7.7	6.3	6.6	8.0	10.2	8.7	9.2	8.8	8.5	7.9	7.6	6.8	8.3	9.3	9.2	8.4
35-44	6.2	6.1	6.4	6.5	9.2	7.6	8.0	8.0	7.1	7.4	7.1	6.5	7.2	8.7	8.3	7.8
45-54	5.7	6.7	6.2	6.6	8.7	8.3	7.5	7.2	7.5	7.4	6.7	6.9	7.8	7.3	7.8	7.3
55-64	6.1	5.1	5.6	5.8	8.9	7.6	8.8	7.6	6.8	7.8	7.8	6.9	8.5	8.7	9.3	7.9
By Region:																
Atlantic[1]	12.0	10.2	10.8	11.6	13.6	12.1	13.5	13.9	12.9	13.4	12.2	12.1	13.0	14.0	14.3	14.2
Quebec	10.0	8.4	8.5	10.3	12.0	9.7	10.9	10.4	9.0	9.4	8.8	7.7	9.3	9.8	10.0	9.5
Ontario	5.8	5.5	5.3	6.2	7.9	6.1	6.4	6.1	5.2	5.1	4.7	4.7	6.3	7.5	7.4	6.2
Man.+Sask.	5.0	4.7	6.1	5.1	7.8	6.3	7.4	6.2	8.0	7.2	7.8	6.2	7.1	6.6	7.6	7.8
Alberta	4.7	4.0	4.2	5.4	10.1	10.1	10.5	8.8	9.6	8.2	7.9	6.9	7.7	8.1	8.5	8.4
BC	8.9	8.4	7.1	7.6	11.7	10.9	10.8	10.1	11.0	9.4	9.0	7.4	8.3	10.0	8.9	8.8
By Industrial Sector:																
Primary	9.5	8.2	8.2	10.9	15.7	14.5	13.9	14.1	17.5	12.7	15.1	14.4	16.5	16.3	17.2	14.8
Construction	25.8	26.7	26.7	28.3	36.4	34.6	34.4	32.3	31.0	30.2	29.2	28.0	32.8	34.4	34.4	30.5
Manufacturing	7.4	6.7	7.1	9.0	11.4	9.4	9.5	8.8	8.0	7.4	7.6	7.9	9.7	9.9	10.0	8.5
Distributive Services	5.7	4.5	4.9	6.0	8.2	6.8	6.7	6.5	5.8	7.5	4.4	4.5	6.1	7.4	7.3	6.5
Business Services	4.5	4.2	3.5	4.9	8.8	5.7	6.9	6.0	6.6	6.0	5.9	4.7	6.5	7.1	6.8	6.6
Consumer Services	6.8	5.9	5.7	5.8	8.0	6.6	7.5	7.2	6.6	5.8	5.8	4.5	5.0	6.5	6.5	6.3
Health, Education & Welfare	3.6	2.8	2.1	2.6	2.5	2.8	3.6	3.2	2.5	3.2	3.0	2.7	4.1	4.5	4.4	4.9
Public Admin.	9.2	5.8	6.2	6.8	7.2	6.1	8.7	8.5	7.1	8.0	6.9	6.5	5.8	6.4	8.0	9.4
By Firm Size:																
Under 20	11.3	10.4	10.2	11.3	15.0	12.8	13.3	12.9	12.3	11.9	11.1	9.9	12.2	13.0	13.2	12.8
20-99	9.3	8.5	8.6	9.4	12.3	10.5	10.6	10.3	9.6	8.5	8.9	8.3	10.1	11.3	11.6	10.0
100-499	6.3	6.3	6.5	7.8	10.6	9.4	9.1	8.8	8.6	7.5	8.0	7.4	8.9	10.7	9.0	8.3
500+	6.7	5.3	5.1	6.0	8.1	6.9	8.5	7.5	6.8	7.6	6.1	5.9	6.3	6.9	7.7	7.3
By Earnings[2]:																
Under $11,000	13.4	12.3	11.9	12.8	16.7	14.4	15.4	15.4	13.7	13.4	12.1	10.8	12.1	13.9	13.8	12.6
$11,000-$40,000	7.3	6.5	6.6	7.6	10.2	8.6	9.0	8.0	7.6	7.1	6.8	6.1	7.5	7.9	7.8	7.2
$40,000+	3.4	2.8	2.7	3.0	4.9	4.6	4.3	4.2	4.2	4.0	3.5	3.6	3.7	5.2	4.8	4.7

(continued)

Table 8 (concluded)
Annual Average Probabilities of Permanent Layoffs and Period-to-Period % Change
(Based on each group's own parameter estimates and the sample of all workers in 1978)

	Annual Average (%)							Period-to-Period % Change		
	78-93	79-81	87-89	82-83	90-91	84-85	92-93	87-89/79-81	90-91/82-83	92-93/84-85
All Workers	8.0	7.0	7.3	9.3	8.4	8.8	8.6	4.8	-9.3	-3.0
By Gender:										
Male	8.6	7.4	7.8	10.1	9.1	9.5	9.1	4.9	-9.8	-3.5
Female	6.5	5.6	5.9	7.3	6.7	7.1	7.1	5.2	-7.5	-1.0
By Age Group:										
15-24	9.3	8.2	8.0	11.0	9.4	10.6	9.7	-1.8	-14.7	-8.5
25-34	8.2	7.0	7.4	9.4	8.8	9.0	8.8	6.6	-6.9	-2.3
35-44	7.4	6.3	7.0	8.4	7.9	8.0	8.0	10.0	-5.9	0.6
45-54	7.2	6.5	7.0	8.5	7.5	7.3	7.6	7.9	-11.4	3.3
55-64	7.5	5.5	7.5	8.3	8.6	8.2	8.6	35.7	4.1	4.8
By Region:										
Atlantic[1]	12.7	10.9	12.6	12.8	13.5	13.7	14.2	15.8	5.3	3.9
Quebec	9.6	9.1	8.6	10.9	9.5	10.7	9.7	-4.7	-12.1	-8.5
Ontario	6.0	5.7	4.8	7.0	6.9	6.2	6.8	-15.0	-1.9	9.5
Man.+Sask.	6.7	5.3	7.1	7.0	6.9	6.8	7.7	34.2	-2.1	13.5
Alberta	7.7	4.5	7.7	10.1	7.9	9.6	8.4	68.9	-21.8	-12.4
BC	9.3	7.7	8.6	11.3	9.2	10.5	8.8	12.0	-18.9	-15.6
By Industrial Sector:										
Primary	13.7	9.1	14.0	15.1	16.4	14.0	16.0	54.8	8.6	14.9
Construction	31.0	27.3	29.2	35.5	33.6	33.4	32.4	7.0	-5.3	-2.9
Manufacturing	8.6	7.6	7.6	10.4	9.8	9.2	9.2	0.2	-6.0	0.5
Distributive Services	6.2	5.2	5.5	7.5	6.7	6.6	6.9	6.3	-10.4	4.9
Business Services	5.9	4.2	5.5	7.2	6.8	6.5	6.7	32.3	-6.1	3.1
Consumer Services	6.3	5.8	5.4	7.3	5.7	7.3	6.4	-7.3	-22.0	-13.0
Health, Education & Welfare	3.3	2.5	3.0	2.7	4.3	3.4	4.7	19.1	60.8	36.4
Public Admin.	7.3	6.3	7.1	6.7	6.1	8.6	8.7	13.2	-9.0	1.2
By Firm Size:										
Under 20	12.1	10.6	11.0	13.9	12.6	13.1	13.0	3.4	-9.5	-0.7
20-99	9.9	8.8	8.6	11.4	10.7	10.5	10.8	-3.3	-6.2	3.5
100-499	8.3	6.9	7.6	10.0	9.8	8.9	8.6	10.9	-1.9	-3.5
500+	6.8	5.5	6.5	7.5	6.6	8.0	7.5	19.2	-11.8	-5.9
By Earnings[2]:										
Under $11,000	13.4	12.3	12.1	15.6	13.0	15.4	13.2	-1.9	-16.4	-14.3
$11,000-$40,000	7.6	6.9	6.7	9.4	7.7	8.5	7.5	-3.3	-18.1	-11.8
$40,000+	4.0	2.8	3.7	4.7	4.5	4.3	4.7	29.3	-5.7	10.2

[1] Including Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick.

[2] Average annual earnings during the years employed over the 1978-93 period, expressed in 1993 constant dollars (adjusted by the consumer price index (CPI)).

Table 9
Estimated Probabilities of Permanent Layoffs in Canada, 1978-93
(Based on each group's own parameter estimates and the sample of all workers in 1993)

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
All Workers	6.4	5.7	5.7	6.5	8.7	7.3	7.8	7.4	6.9	6.7	6.3	5.7	6.9	7.6	7.6	7.1
By Gender:																
Male	6.9	6.1	6.2	7.1	9.6	8.2	8.6	8.0	7.7	7.2	6.9	6.4	7.6	8.3	8.3	7.7
Female	5.6	4.9	4.5	5.3	7.0	5.8	6.4	6.1	5.5	5.7	5.2	4.5	5.4	6.3	6.4	6.0
By Age Group:																
15-24	8.0	6.8	6.5	7.7	10.4	8.5	9.5	8.7	8.1	7.5	7.0	6.1	7.6	8.5	8.4	8.3
25-34	6.9	5.6	5.8	7.1	9.0	7.7	8.2	7.8	7.6	7.0	6.7	6.0	7.3	8.2	8.2	7.5
35-44	5.4	5.3	5.7	5.7	8.1	6.7	7.0	7.0	6.2	6.5	6.2	5.7	6.3	7.6	7.3	6.8
45-54	5.0	5.9	5.5	5.9	7.7	7.4	6.7	6.4	6.6	6.6	6.0	6.1	6.9	6.5	7.0	6.5
55-64	5.4	4.5	5.0	5.1	7.9	6.7	7.8	6.7	6.0	6.9	6.9	6.1	7.5	7.7	8.2	7.0
By Region:																
Atlantic[1]	10.0	8.4	9.0	9.7	11.3	10.1	11.2	11.6	10.7	11.2	10.2	10.1	10.9	11.7	11.9	11.8
Quebec	8.6	7.3	7.4	9.0	10.5	8.4	9.5	9.1	7.8	8.2	7.6	6.7	8.1	8.5	8.7	8.3
Ontario	4.8	4.6	4.5	5.2	6.7	5.1	5.4	5.1	4.4	4.2	3.9	3.9	5.2	6.3	6.3	5.2
Man.+Sask.	4.1	3.9	5.0	4.2	6.5	5.2	6.1	5.1	6.6	6.0	6.5	5.2	5.9	5.5	6.3	6.5
Alberta	3.8	3.2	3.4	4.3	8.2	8.2	8.5	7.1	7.8	6.7	6.4	5.6	6.2	6.6	6.9	6.8
BC	7.6	7.1	6.0	6.5	10.0	9.4	9.2	8.7	9.4	8.0	7.7	6.4	7.1	8.6	7.6	7.5
By Industrial Sector:																
Primary	9.0	7.8	7.8	10.4	15.0	13.8	13.2	13.4	16.6	12.1	14.4	13.7	15.7	15.6	16.4	14.2
Construction	22.3	23.1	23.1	24.5	31.6	30.1	29.9	28.0	26.9	26.2	25.3	24.3	28.5	29.9	29.8	26.4
Manufacturing	6.9	6.2	6.6	8.3	10.6	8.7	8.8	8.2	7.4	6.8	7.0	7.3	9.0	9.2	9.3	7.8
Distributive Services	5.4	4.3	4.7	5.7	7.8	6.5	6.3	6.2	5.5	7.1	4.2	4.3	5.8	7.0	6.9	6.2
Business Services	4.2	3.9	3.2	4.5	8.1	5.2	6.4	5.6	6.1	5.6	5.4	4.3	6.0	6.5	6.3	6.0
Consumer Services	6.4	5.5	5.3	5.4	7.5	6.2	7.0	6.7	6.2	5.4	5.4	4.2	4.6	6.0	6.1	5.9
Health, Education & Welfare	2.9	2.3	1.7	2.1	2.1	2.3	2.9	2.6	2.0	2.6	2.5	2.2	3.4	3.7	3.6	4.0
Public Admin.	7.8	4.9	5.3	5.7	6.1	5.2	7.3	7.2	6.0	6.8	5.8	5.5	4.9	5.4	6.7	7.9
By Firm Size:																
Under 20	9.4	8.6	8.5	9.4	12.5	10.6	11.1	10.7	10.2	9.9	9.3	8.2	10.1	10.8	11.0	10.7
20-99	7.4	6.7	6.8	7.5	9.8	8.3	8.4	8.2	7.6	6.7	7.0	6.6	8.0	9.0	9.3	7.9
100-499	4.8	4.8	5.0	5.9	8.2	7.2	7.0	6.7	6.6	5.7	6.1	5.6	6.8	8.3	6.9	6.3
500+	4.8	3.8	3.7	4.4	5.9	5.0	6.2	5.4	4.9	5.6	4.5	4.2	4.6	5.0	5.6	5.3
By Earnings[2]:																
Under $11,000	11.6	10.7	10.3	11.1	14.5	12.5	13.4	13.3	11.9	11.6	10.5	9.3	10.5	12.0	12.0	10.9
$11,000-$40,000	6.2	5.5	5.6	6.5	8.7	7.3	7.7	6.8	6.5	6.0	5.8	5.2	6.4	6.7	6.6	6.1
$40,000+	2.6	2.1	2.1	2.3	3.7	3.5	3.3	3.2	3.2	3.0	2.7	2.7	2.8	4.0	3.6	3.6

(continued)

Table 9 (concluded)
Annual Average Probabilities of Permanent Layoffs and Period-to-Period % Change
(Based on each group's own parameter estimates and the sample of all workers in 1993)

	Annual Average (%)							Period-to-Period % Change		
	78-93	79-81	87-89	82-83	90-91	84-85	92-93	87-89/79-81	90-91/82-83	92-93/84-85
All Workers	6.9	6.0	6.3	8.0	7.3	7.6	7.4	4.9	-9.4	-3.0
By Gender:										
Male	7.5	6.5	6.8	8.9	8.0	8.3	8.0	4.9	-9.9	-3.5
Female	5.7	4.9	5.1	6.4	5.9	6.3	6.2	5.2	-7.5	-1.0
By Age Group:										
15-24	8.0	7.0	6.9	9.4	8.1	9.1	8.3	-1.8	-14.7	-8.5
25-34	7.3	6.2	6.6	8.3	7.8	8.0	7.8	6.6	-6.9	-2.3
35-44	6.5	5.6	6.1	7.4	6.9	7.0	7.1	10.1	-6.0	0.6
45-54	6.4	5.8	6.2	7.5	6.7	6.5	6.7	7.9	-11.4	3.3
55-64	6.6	4.9	6.6	7.3	7.6	7.3	7.6	35.9	4.1	4.8
By Region:										
Atlantic[1]	10.6	9.0	10.5	10.7	11.3	11.4	11.9	16.0	5.3	4.0
Quebec	8.3	7.9	7.5	9.4	8.3	9.3	8.5	-4.8	-12.2	-8.6
Ontario	5.1	4.8	4.0	5.9	5.8	5.2	5.7	-15.1	-1.9	9.6
Man.+Sask.	5.5	4.4	5.9	5.8	5.7	5.6	6.4	34.6	-2.1	13.6
Alberta	6.2	3.7	6.2	8.2	6.4	7.8	6.8	69.9	-22.1	-12.6
BC	7.9	6.5	7.3	9.7	7.8	9.0	7.6	12.2	-19.0	-15.7
By Industrial Sector:										
Primary	13.1	8.7	13.4	14.4	15.7	13.3	15.3	54.5	8.6	14.8
Construction	26.9	23.6	25.2	30.9	29.2	29.0	28.1	7.1	-5.4	-2.9
Manufacturing	8.0	7.0	7.1	9.7	9.1	8.5	8.5	0.2	-6.0	0.5
Distributive Services	5.9	4.9	5.2	7.1	6.4	6.3	6.6	6.3	-10.4	4.9
Business Services	5.5	3.9	5.1	6.7	6.3	6.0	6.2	32.2	-6.1	3.1
Consumer Services	5.9	5.4	5.0	6.8	5.3	6.9	6.0	-7.2	-22.0	-13.0
Health, Education & Welfare	2.7	2.0	2.4	2.2	3.5	2.8	3.8	19.2	61.0	36.5
Public Admin.	6.2	5.3	6.0	5.6	5.1	7.3	7.3	13.3	-9.0	1.2
By Firm Size:										
Under 20	10.1	8.8	9.1	11.5	10.4	10.9	10.8	3.4	-9.5	-0.7
20-99	7.8	7.0	6.8	9.0	8.5	8.3	8.6	-3.3	-6.3	3.5
100-499	6.4	5.2	5.8	7.7	7.5	6.9	6.6	11.1	-1.9	-3.6
500+	4.9	4.0	4.8	5.4	4.8	5.8	5.5	19.9	-12.2	-6.1
By Earnings[2]:										
Under $11,000	11.6	10.7	10.5	13.5	11.3	13.4	11.5	-1.9	-16.5	-14.3
$11,000-$40,000	6.5	5.8	5.6	8.0	6.5	7.2	6.4	-3.3	-18.2	-11.9
$40,000+	3.0	2.2	2.8	3.6	3.4	3.3	3.6	29.9	-5.8	10.4

[1] Including Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick.

[2] Average annual earnings during the years employed over the 1978-93 period, expressed in 1993 constant dollars (adjusted by the consumer price index (CPI)).

These estimated probabilities of permanent layoffs largely confirm findings observed above, but the magnitude of the inter-groups differentials in particular is reduced. After controlling for the effects of changing gender, age, province, industry, earnings level and firm size composition of workers, the average risk of permanent layoffs is higher for men than for women; higher among those under 35 years of age than among their older counterparts; highest in Atlantic Canada and lowest in Ontario; highest in the construction sector and lowest in health, education and welfare services; decreases with firm size and workers' annual average earnings. But as noted, the magnitude of the inter-group differences is reduced. For example, the average annual layoff rate is 9.1% for men vs 4.8% for women in the raw data. After controlling for compositional differences, this is reduced to 8.6% vs 6.5%. Similarly, while the average annual layoff rate is 8.3% for workers under 25 years of age compared to 6.2% for those over 54 in the raw data, the difference is reduced to 9.3% vs 7.5%.

As for the time trend, the average risk of permanent layoffs for all workers was lower in the early 1990s recession and recovery than in earlier comparable periods. Further sub-sample comparisons reveal that the particular groups of workers who experienced substantially higher average risk of permanent layoffs in the early 1990s are those in the health, education and welfare services, and the primary sector. Other groups of workers that have experienced modest increase in the average risk of permanent layoffs in the 1990s recovery period (compared to a comparable earlier period) are those over 54 years of age; those in the Atlantic provinces, Ontario, Manitoba and Saskatchewan; those in the business services, distributive services; and high-paid workers (with annual average earnings over $40,000). The average risk of permanent layoffs for other groups of workers in the early 1990s is either the same as or lower than in comparable periods in the 1980s.

5. *Discussion and Conclusion*

Canadians are increasingly concerned about rising job instability in the 1990s. There is a general perception in the population that jobs are not as stable as they once were. Job instability can take various forms and be measured in numerous ways. One important dimension is permanent layoffs. As part of a comprehensive research effort on job instability, this paper has empirically assessed the trend of permanent layoffs in Canada between 1978 and 1993.

Created by many complex processes, permanent layoffs are an on-going feature of our economy and not as cyclically sensitive as quits and other means of workforce adjustment used by firms (i.e., temporary layoffs and hirings). Every year, a large number of workers are permanently displaced from their jobs (over a million), no matter in recessions or in recovery and expansionary periods. This is as true in the early 1990s as in the 1980s. This very large number of displacements may be masking smaller annual changes due to increased restructuring, downsizing, the impact of technology advancements, and other changes.

The data at hand show no sign of a general rise in the permanent layoff rate up to 1993 at least, when compared to earlier years which are comparable in the business cycle. This holds true whether using the raw data or after controlling for changes in the composition of the workforce. However, an increase in the layoff rate is observed among some particular groups of workers, notably older and higher paid workers, those in the health, education and welfare services and the primary sector; and to a lesser

degree, those in Ontario and the Atlantic provinces, those in the business services and distributive services.

The findings fit with the results of the job tenure literature noted earlier. Overall, average job tenure has changed very little, so one would not expect average permanent separation rates to have changed dramatically, although the composition (i.e., among quits, layoffs or "other" separations) of the total separation rate could have changed. The most recent American study (Farber (1996)) of displaced workers (covering up to 1993) did find an increase in the incidence of displacement, particularly among older, more educated workers. While we observe no rising trend in the general permanent layoff rate, we do find that there were increased rates among older, more highly paid (and likely better educated) workers, as was the case in the U.S.

The data suggest that the Canadian labour market adjusts to structural change more through depressed hiring than increased layoffs. Having lost a job, it was much more difficult to find a new one in the recovery period of the 1990s then in the 1980s. And for those seeking a first job, the labour market was a less hospitable place; hence the increased concern regarding youth in the labour market. This would result in an increased sense of job instability/insecurity. Job security is not so important if one can easily locate a new job; it is much more important otherwise.

There are other reasons why the sense of job instability may have risen among Canadians. The number of self-employed workers has increased, and self-employment is typically a more unstable form of work than paid employment. The self-employed were not included in this analysis, since layoff data are not available for this group. Between the last business cycle peak, 1989, and 1996, three quarters of all jobs created were self-employed. Full-time paid employment did not increase over this period. Hence, although the likelihood of layoff from a paid job did not increase to 1993, those seeking work found it more difficult to find a paid job creation in paid full-time jobs. It is self- employment that expanded over this period. This would tend to contribute to a sense of rising job instability. Self-employment has inherently potentially more unstable earnings than a paid job. Other forms of contingent work (e.g., temporary and on-call) have also been increasing. They too may not be picked up in the layoff statistics, as they may be associated with an increase in "on-call" kind of work, where a separation is not deemed to have taken place each time there is a break in employment and hence, a layoff would not be registered.

Furthermore, permanent layoffs are now observed among groups of workers who previously were almost totally immune from job displacement, notably public sector workers, older workers, and higher paid (likely better educated) workers who may be middle managers or professionals. While layoff rates continue to be below average for these groups, the increase could however instil a sense of insecurity in the population.

In conclusion, numerous changes in the form of increasing self-employment, increased contract work, increased numbers of peripheral/contingent workers, increases in temporary and part-time jobs, decreased hiring demand and others may have been taking place. They may all have contributed to the sense of rising job instability/insecurity. Relatively little is known regarding some of these phenomena. The data at hand suggest, however, that the overall risk of permanently losing one's paid job in the early 1990s was no higher than in earlier comparable periods in Canada, although some groups of

workers have experienced modest or even substantial increases in the layoff rate. It is important to note, however, that the chance of finding a new job in the 1990s recovery was considerably lower than in the 1980s, at least in the aggregate.

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Appendix

The Logistic Regression Results

The Logistic Model

At any given point in time t, worker i is observed with a vector of personal and employer characteristics X_{it}. Define $Y_{it} = 1$ if worker i is observed with a permanent layoff in time t and $Y_{it} = 0$ otherwise. In the logistic model, the probability of worker i being permanently laid off in time t is given by:

(1) $Pr(Y_{it} = 1) = e^{\beta(X_{it})}/[1 + e^{\beta(X_{it})}]$.

The model of estimation is written as the transformation:

(2) $Ln\{Pr(Y_{it} = 1)/[1 - Pr(Y_{it} = 1)]\} = \beta(X_{it})$,

where β is a vector of parameters to be estimated.

The Variables

To examine the trend of permanent layoffs over time, we pool the data from 1978 to 1993 and estimate the probability of a worker being permanently laid off in each year through the use of a series of year dummy variables. Other explanatory variables in the regressions include dummy variables on gender (2), age groups (5), province (10), industry (8), and employer size (4). Following are the definitions of these variables.

Dependent Variable:

Permanent layoff = 1 if a worker leaves a firm because of shortage of work and does not return in the same or following year;
= 0 otherwise.

Explanatory variables:

Year: year of employment (16 dummies corresponding to each year from 1978 to 1993);
Gender: 2 dummies (male and female);
Age: as of the year of employment (5 dummies: 15-24, 25-34, 35-44, 45-54, and 55-64);
Province: province of employment each year (10 dummies corresponding to each province);
Firm size: firm size of employment each year (4 dummies: 1-19, 20-99, 100-499 and 500+);
Industry: industry of employment each year (8 dummies corresponding to each sector).

The Sample and the Regressions

The final sample of 733,425 observations used for empirical estimation is extracted from the Longitudinal Worker File. It represents a three-in-a-thousand random sample of all Canadian workers employed at any time during the 1978-93 period. The agricultural sector is excluded.

The model is first estimated on the overall sample of all workers. 1978, male, age 15 to 24, Ontario, manufacturing and small employers serve as the control categories. This allows the intercept to vary but imposes the same coefficients on the year dummy variables across different sub-group of workers (i.e., imposes the same time trend on all sub-groups). Since our objective is to examine whether or not permanent layoffs have increased for all workers as well as among particular groups of workers, the model is then re-estimated on various sub-samples to allow both the intercept and the coefficients of the year dummy variables to change. This allows for different time trends among different groups of workers, but still controls for changes in the composition of workers by gender, age, province, industry and firm size and earnings level.

We perform a total of 29 logistic regressions, one for all workers and one for each of the following sub-population groups: men and women separately, 5 age groups, 6 regional labour markets, 8 industrial sectors, 4 firm-size classes, and 3 earnings levels. All explanatory variables other than that used to define the sub-population are used in these regressions.

The Results

Due to the large number of regressions, we only report the estimated coefficients (β's) and asymptotic T-ratios of the year dummy variables in Table A. Parameter estimates of other variables are available upon request. These parameter estimates are then used to calculate the annual probabilities of permanent layoffs for each group of workers (see discussions in the text).

Table A
Logistic Regression Results of the Year Dummy Variables on the Probability of Permanent Layoffs in Canada, 1978-93*

	All Workers		By Region[1]											
			Atlantic		Quebec		Ontario		Man. + Sask.		Alberta		BC	
	β	T	β	T	β	T	β	T	β	T	β	T	β	T
1979	-0.1332	-4.32	-0.2006	-2.27	-0.2001	-3.61	-0.0624	-1.10	-0.0595	-0.42	-0.1594	-1.52	-0.0755	-0.93
1980	-0.1382	-4.49	-0.1294	-1.47	-0.1868	-3.37	-0.0865	-1.50	0.2218	1.67	-0.1076	-1.04	-0.2652	-3.20
1981	0.0147	0.50	-0.0395	-0.46	0.0427	0.81	0.0897	1.64	0.0178	0.13	0.1595	1.67	-0.1860	-2.34
1982	0.3500	12.28	0.1481	1.77	0.2285	4.37	0.3611	6.77	0.5017	3.90	0.8693	9.77	0.3179	4.14
1983	0.1536	5.21	0.0063	0.07	-0.0324	-0.60	0.0702	1.26	0.2574	1.94	0.8701	9.53	0.2406	3.06
1984	0.2294	7.97	0.1361	1.66	0.1054	2.04	0.1155	2.12	0.4422	3.43	0.9178	9.99	0.2260	2.87
1985	0.1576	5.47	0.1786	2.21	0.0557	1.08	0.0570	1.05	0.2352	1.79	0.7075	7.59	0.1517	1.93
1986	0.0892	3.10	0.0810	0.99	-0.1217	-2.31	-0.1107	-2.02	0.5325	4.28	0.8166	8.83	0.2484	3.25
1987	0.0489	1.71	0.1280	1.60	-0.0663	-1.29	-0.1416	-2.61	0.4225	3.33	0.6356	6.71	0.0591	0.76
1988	-0.0172	-0.60	0.0192	0.24	-0.1477	-2.86	-0.2254	-4.11	0.5107	4.05	0.5898	6.25	0.0063	0.08
1989	-0.1266	-4.38	0.0095	0.12	-0.2958	-5.65	-0.2271	-4.17	0.2489	1.91	0.4290	4.46	-0.2075	-2.68
1990	0.0783	2.79	0.0976	1.24	-0.0753	-1.48	0.0918	1.75	0.3990	3.12	0.5533	5.89	-0.0833	-1.10
1991	0.2003	7.13	0.1840	2.33	-0.0237	-0.46	0.3037	5.85	0.3229	2.49	0.6151	6.51	0.1381	1.87
1992	0.1976	6.93	0.2114	2.66	0.0008	0.02	0.2901	5.49	0.4748	3.69	0.6731	7.12	-0.0066	-0.09
1993	0.1175	4.07	0.1976	2.47	-0.0514	-0.98	0.0792	1.43	0.5022	3.92	0.6529	6.86	-0.0126	-0.17

(continued)

Table A (continued)
Logistic Regression Results of the Year Dummy Variables on the Probability of Permanent Layoffs in Canada, 1978-93*

	By Gender				By Age Group									
	Male		Female		15-24		25-34		35-44		45-54		55-64	
	β	T	β	T	β	T	β	T	β	T	β	T	β	T
1979	-0.1324	-3.66	-0.1383	-2.38	-0.1776	-3.66	-0.2284	-3.98	-0.0201	-0.25	0.1862	1.99	-0.1984	-1.52
1980	-0.1075	-2.97	-0.2228	-3.80	-0.2291	-4.63	-0.1861	-3.29	0.0434	0.55	0.1076	1.13	-0.0853	-0.67
1981	0.0407	1.18	-0.0606	-1.09	-0.0319	-0.68	0.0396	0.75	0.0520	0.67	0.1818	1.95	-0.0469	-0.37
1982	0.3864	11.43	0.2528	4.74	0.3095	6.67	0.3210	6.21	0.4624	6.33	0.4962	5.51	0.4577	3.94
1983	0.1983	5.67	0.0411	0.74	0.0769	1.57	0.1299	2.44	0.2378	3.15	0.4476	4.93	0.2675	2.22
1984	0.2595	7.59	0.1517	2.84	0.2086	4.43	0.2043	3.91	0.2945	4.02	0.3287	3.57	0.4396	3.79
1985	0.1728	5.05	0.1090	2.06	0.0987	2.09	0.1519	2.94	0.2928	4.04	0.2716	2.95	0.2698	2.26
1986	0.1266	3.71	-0.0087	-0.16	0.0159	0.33	0.1137	2.22	0.1533	2.09	0.3221	3.56	0.1382	1.14
1987	0.0534	1.57	0.0275	0.52	-0.0680	-1.42	0.0247	0.48	0.2012	2.80	0.3079	3.42	0.2972	2.55
1988	-0.0011	-0.03	-0.0647	-1.22	-0.1407	-2.99	-0.0268	-0.52	0.1477	2.05	0.1986	2.15	0.2909	2.42
1989	-0.0853	-2.49	-0.2276	-4.21	-0.2922	-6.06	-0.1449	-2.78	0.0545	0.76	0.2323	2.58	0.1517	1.25
1990	0.1227	3.66	-0.0226	-0.43	-0.0550	-1.13	0.0777	1.54	0.1665	2.37	0.3665	4.19	0.4002	3.57
1991	0.2235	6.63	0.1473	2.87	0.0803	1.62	0.2088	4.17	0.3888	5.67	0.2894	3.27	0.4278	3.79
1992	0.2141	6.26	0.1592	3.08	0.0590	1.15	0.2029	4.00	0.3404	4.90	0.3767	4.31	0.5087	4.52
1993	0.1361	3.92	0.0789	1.50	0.0448	0.86	0.0980	1.88	0.2599	3.72	0.2992	3.41	0.3126	2.68

(continued)

Table A (continued)
Logistic Regression Results of the Year Dummy Variables on the Probability of Permanent Layoffs in Canada, 1978-93*

	By Firm Size								By Average Annual Earnings[2]					
	1-19		20-99		100-499		500+		Under $11,000		$11,000-$40,000		Over $40,000	
	β	T	β	T	β	T	β	T	β	T	β	T	β	T
1979	-0.1020	-2.04	-0.1083	-1.69	0.0012	0.01	-0.2786	-4.45	-0.0991	-1.74	-0.1374	-3.50	-0.2029	-1.86
1980	-0.1208	-2.42	-0.0842	-1.32	0.0376	0.46	-0.3194	-5.05	-0.1465	-2.55	-0.1199	-3.07	-0.2486	-2.20
1981	-0.0008	-0.02	0.0166	0.27	0.2426	3.12	-0.1248	-2.10	-0.0585	-1.07	0.0541	1.45	-0.1415	-1.28
1982	0.3263	7.02	0.3265	5.37	0.6224	8.14	0.2473	4.35	0.2683	4.95	0.4022	11.11	0.4337	4.33
1983	0.1410	2.99	0.1427	2.27	0.4772	6.00	0.0387	0.64	0.0862	1.54	0.1898	5.05	0.3471	3.35
1984	0.1905	4.13	0.1556	2.51	0.4342	5.47	0.3081	5.40	0.1710	3.21	0.2536	6.87	0.2879	2.71
1985	0.1522	3.33	0.1176	1.94	0.3931	4.97	0.1453	2.46	0.1647	3.20	0.1125	3.02	0.2598	2.40
1986	0.0975	2.14	0.0407	0.67	0.3703	4.72	0.0215	0.36	0.0258	0.50	0.0516	1.38	0.2514	2.29
1987	0.0571	1.26	-0.1058	-1.73	0.1973	2.48	0.1719	2.96	-0.0010	-0.02	-0.0361	-0.96	0.1815	1.60
1988	-0.0192	-0.42	-0.0525	-0.88	0.2804	3.63	-0.0999	-1.64	-0.1216	-2.45	-0.0746	-1.96	0.0360	0.31
1989	-0.1527	-3.28	-0.1302	-2.24	0.1794	2.37	-0.1559	-2.42	-0.2589	-5.24	-0.2039	-5.26	0.0710	0.61
1990	0.0825	1.83	0.0947	1.66	0.4070	5.46	-0.0724	-1.13	-0.1180	-2.45	0.0374	0.99	0.0974	0.82
1991	0.1560	3.46	0.2255	3.92	0.6401	8.69	0.0438	0.69	0.0397	0.83	0.0916	2.39	0.5129	4.68
1992	0.1815	4.02	0.2647	4.59	0.4190	5.36	0.1785	2.86	0.0327	0.68	0.0809	2.07	0.3986	3.46
1993	0.1452	3.21	0.0831	1.39	0.3210	4.02	0.1232	1.93	-0.0719	-1.49	-0.0075	-0.19	0.3811	3.25

(continued)

Table A (concluded)
Logistic Regression Results of the Year Dummy Variables on the Probability of Permanent Layoffs in Canada, 1978-93*

	By Industry															
	Primary		Construction		Manufacturing		Distributive Services		Business Services		Consumer Services		Health, Education & Welfare		Public Admin.	
	β	T	β	T	β	T	β	T	β	T	β	T	β	T	β	T
1979	-0.1637	-1.00	0.0459	0.75	-0.1081	-1.59	-0.2452	-2.50	-0.0833	-0.67	-0.1622	-2.57	-0.2538	-1.72	-0.5215	-4.13
1980	-0.1686	-1.04	0.0447	0.73	-0.0430	-0.64	-0.1681	-1.76	-0.2757	-2.14	-0.1902	-3.01	-0.5361	-3.40	-0.4443	-3.57
1981	0.1605	1.07	0.1230	2.07	0.2082	3.26	0.0561	0.62	0.0743	0.64	-0.1794	-2.93	-0.3372	-2.31	-0.3464	-2.93
1982	0.6037	4.13	0.4814	8.06	0.4845	7.69	0.3951	4.53	0.7227	6.76	0.1786	3.08	-0.3518	-2.38	-0.2796	-2.37
1983	0.5050	3.43	0.4064	6.60	0.2630	4.02	0.1883	2.06	0.2377	2.05	-0.0305	-0.51	-0.2339	-1.65	-0.4596	-3.69
1984	0.4499	3.08	0.3979	6.47	0.2762	4.29	0.1643	1.81	0.4603	4.19	0.1086	1.90	0.0173	0.13	-0.0673	-0.60
1985	0.4657	3.22	0.3072	5.03	0.1937	2.99	0.1369	1.53	0.3042	2.75	0.0541	0.95	-0.1056	-0.78	-0.0957	-0.85
1986	0.7356	5.24	0.2474	4.10	0.0775	1.17	0.0162	0.18	0.3996	3.70	-0.0363	-0.64	-0.3846	-2.67	-0.3005	-2.53
1987	0.3426	2.37	0.2114	3.55	-0.0047	-0.07	0.2906	3.43	0.3079	2.85	-0.1718	-2.97	-0.1150	-0.86	-0.1632	-1.41
1988	0.5500	3.92	0.1664	2.83	0.0207	0.32	-0.2736	-2.88	0.2779	2.58	-0.1805	-3.12	-0.1656	-1.24	-0.3334	-2.81
1989	0.4932	3.48	0.1099	1.89	0.0700	1.08	-0.2467	-2.70	0.0290	0.27	-0.4407	-7.26	-0.2904	-2.15	-0.4018	-3.27
1990	0.6659	4.75	0.3295	5.69	0.2966	4.69	0.0702	0.81	0.3931	3.79	-0.3375	-5.69	0.1552	1.26	-0.5289	-4.04
1991	0.6506	4.56	0.3981	6.74	0.3213	4.98	0.2732	3.21	0.4774	4.59	-0.0585	-1.02	0.2553	2.10	-0.4166	-3.26
1992	0.7199	5.01	0.3951	6.50	0.3305	5.06	0.2602	3.04	0.4392	4.18	-0.0532	-0.92	0.2221	1.81	-0.1643	-1.37
1993	0.5319	3.68	0.2243	3.59	0.1450	2.14	0.1418	1.62	0.3963	3.73	-0.0852	-1.47	0.3440	2.85	0.0234	0.20

* 1978 serves as the control case for the year dummy variables. Other explanatory variables in the regressions include dummy variables on gender, age groups, province, industry, and employer size. All these explanatory variables except those used to identify the sub-population groups are used in the regressions. Parameter estimates of these variables are not reported here, but they are available upon request.

[1] Including Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick.

[2] Expressed in 1993 constant dollars (adjusted by the consumer price index (CPI)).

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